

TECHNO-SOCIO-ECONOMIC AND ENVIRONMENTAL IMPACTS OF BIO-FUEL USE

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Abstract

Sustainability is an important issue while examining the feasibility of Bio-fuel use. Issues related to sustainability of Bio-fuels are far more complex than other renewable energy sources. A general overview of different aspects of use bio-fuel in I.C. Engine is presented to understand the complexity in developing a sustainability model for Bio-fuel energy system. Use of Bio-fuel is closely linked with, technical, economic, environment, even the sociality of the region. All these factors interact with each other in a complex manner to generate the dynamics of use of bio-fuel, changes in land use pattern and emissions arising thereof. The dynamics within the system is analyzed by making a simulation model using System Dynamics modeling frame work. Bio-fuel energy system is divided in to four sectors namely; Technical, Social, Economic and Environmental. The interaction between them and their feedback structure is presented using causal loop diagrams. These diagrams help in understanding, how any change in the system through policy interventions has its repercussions in whole of the system.

Keywords : Causal loop, Fossil fuel, Waste land, Food security, System dynamics, Pollution.